REMARKS

By this amendment, a typographical error was corrected in the specification and Claim 1 has been canceled and Claims 2-41 have been added. It is respectfully submitted that the corrections to the specification and new claims do not add any new matter to this application.

The Examiner is invited to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

If there are any additional charges, please charge them to Deposit Account No. 50-1302.

Respectfully submitted,
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on July 24, 2001 by Irena Say

"MARKED UP" VERSION OF REPLACEMENT SECTION

FIG. 2 is a block diagram of a receiver 200 for processing received data [z]$\underline{y}(t)$ 202 from communications channel 106 according to an embodiment of the invention. As with the conventional arrangement 100 of FIG. 1, received data $y(t)$ 202, obtained from communications channel 106, is the sum of the output of communications channel 106 $x(t)$ and an additive noise signal $w(t)$. The received data $y(t)$ 202 is processed by a differential amplifier 204, one or more receive filters 206 and an analog-to-digital converter 208 to produce a sampled signal $y(n)$, where n is the sample number.

CLAIMS IN "MARKED UP" FORM

1. (CANCELED) A method for processing data received from a communications channel comprising the computer-implemented steps of:

receiving, from the communications channel, received data that is based upon both modulated data and distortion introduced by the communications channel, wherein the modulated data is the result of original data modulated onto one or more carriers;

generating sampled data by sampling the received data at a specified rate that satisfies specified sampling criteria;

generating a filtered observation sequence by processing the sampled data;

generating estimated modulated data by processing the filtered observation sequence using a recursive filter; and

recovering an estimate of the original data by demodulating the estimated modulated data.

2. (NEW) A method for processing data received from a communications channel comprising the computer-implemented steps of:

receiving, from the communications channel, received data that is based upon both modulated data and distortion introduced by the communications channel, wherein the modulated data is the result of original data modulated onto one or more carriers;

equalizing the received data using an equalizer to generate equalized data, wherein the equalizer uses an algorithm with a set of one or more coefficients selected to account for a frequency domain response of the equalizer; and

recovering an estimate of the original data by demodulating the equalized data.

3. (NEW) The method as recited in Claim 2, wherein the set of one or more coefficients is selected to reduce variations in the frequency domain response of the equalizer.

4. (NEW) The method as recited in Claim 2, wherein the set of one or more coefficients is further selected to reduce the distortion introduced by the communications channel.

5. (NEW) The method as recited in Claim 2, wherein the received data was modulated using a cyclic prefix and the set of one or more coefficients is selected to ensure that a combined impulse response of the communications channel and the equalizer is less than the cyclic prefix.

6. (NEW) The method as recited in Claim 2, wherein finite precision arithmetic is employed in the equalizer to implement the algorithm and the set of one or more

coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic in the equalizer.

7. (NEW) The method as recited in Claim 6, wherein the set of one or more coefficients is determined based upon modeling noise attributable to the round off errors as a white noise source at an output of the equalizer.

8. (NEW) The method as recited in Claim 2, wherein the step of demodulating the equalized data includes the use of finite precision arithmetic and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic to demodulate the equalized data.

9. (NEW) The method as recited in Claim 8, wherein the step of demodulating the equalized data includes the use of a fast fourier transfer algorithm and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic to implement the fast fourier transfer algorithm.

10. (NEW) The method as recited in Claim 2, wherein the step of equalizing the received data includes processing the received data using a finite impulse response (FIR) filter.

11. (NEW) The method as recited in Claim 10, wherein the received data is modulated using discrete multitone modulation and a set of one or more (FIR) coefficients for the finite impulse response filter is selected to maximize, in the equalizer, the numbers of bits used to represent each discrete multitone symbol.

12. (NEW) The method as recited in Claim 2, wherein the method further comprises processing the received data using an analog-to-digital converter and the set of one or or

more coefficients is further selected to account for quantization noise in the analog-to-digital converter.

13. (NEW) The method as recited in Claim 2, wherein the communications channel is a twisted pair telephone line.

14. (NEW) A computer-readable medium carrying one or more sequences of one or more instructions for processing data received from a communications channel, wherein the processing of the one or more sequences of one or more instructions by one or more processors cause the one or more processors to perform the steps of:

receiving, from the communications channel, received data that is based upon both modulated data and distortion introduced by the communications channel, wherein the modulated data is the result of original data modulated onto one or more carriers;

equalizing the received data using an equalizer to generate equalized data, wherein the equalizer uses an algorithm with a set of one or more coefficients selected to account for a frequency domain response of the equalizer; and

recovering an estimate of the original data by demodulating the equalized data.

15. (NEW) The computer-readable medium as recited in Claim 14, wherein the set of one or more coefficients is selected to reduce variations in the frequency domain response of the equalizer.

16. (NEW) The computer-readable medium as recited in Claim 14, wherein the set of one or more coefficients is further selected to reduce the distortion introduced by the communications channel.

17. (NEW) The computer-readable medium as recited in Claim 14, wherein the received data was modulated using a cyclic prefix and the set of one or more coefficients is selected to ensure that a combined impulse response of the communications channel and the equalizer is less than the cyclic prefix.

18. (NEW) The computer-readable medium as recited in Claim 14, wherein finite precision arithmetic is employed in the equalizer to implement the algorithm and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic in the equalizer.

19. (NEW) The computer-readable medium as recited in Claim 18, wherein the set of one or more coefficients is determined based upon modeling noise attributable to the round off errors as a white noise source at an output of the equalizer.

20. (NEW) The computer-readable medium as recited in Claim 14, wherein the step of demodulating the equalized data includes the use of finite precision arithmetic and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic to demodulate the equalized data.

21. (NEW) The computer-readable medium as recited in Claim 20, wherein the step of demodulating the equalized data includes the use of a fast fourier transfer algorithm and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic to implement the fast fourier transfer algorithm.

22. (NEW) The computer-readable medium as recited in Claim 14, wherein the step of equalizing the received data includes processing the received data using a finite impulse response (FIR) filter.

23. (NEW) The computer-readable medium as recited in Claim 22, wherein the received data is modulated using discrete multitone modulation and a set of one or more (FIR) coefficients for the finite impulse response filter is selected to maximize, in the equalizer, the numbers of bits used to represent each discrete multitone symbol.

24. (NEW) The computer-readable medium as recited in Claim 14, wherein the computer-readable medium includes one or more additional instructions which, when executed by the one or more processors, cause the one or more processors to process the received data using an analog-to-digital converter and the set of one or more coefficients is further selected to account for quantization noise in the analog-to-digital converter.

25. (NEW) The computer-readable medium as recited in Claim 14, wherein the communications channel is a twisted pair telephone line.

26. (NEW) An apparatus for processing data received from a communications channel comprising:

an equalizer configured to equalize received data from the communications channel and generate equalized data, wherein the received data is based upon both modulated data and distortion introduced by the communications channel, and the modulated data is the result of original data modulated onto one or more carriers, and wherein the equalizer is configured to use an algorithm with a set

of one or more coefficients selected to account for a frequency domain response of the equalizer; and

a demodulator configured to generate an estimate of the original data by demodulating the equalized data.

27. (NEW) The apparatus as recited in Claim 26, wherein the set of one or more coefficients is selected to reduce variations in the frequency domain response of the equalizer.

28. (NEW) The apparatus as recited in Claim 26, wherein the set of one or more coefficients is further selected to reduce the distortion introduced by the communications channel.

29. (NEW) The apparatus as recited in Claim 26, wherein the received data was modulated using a cyclic prefix and the set of one or more coefficients is selected to ensure that a combined impulse response of the communications channel and the equalizer is less than the cyclic prefix.

30. (NEW) The apparatus as recited in Claim 26, wherein finite precision arithmetic is employed in the equalizer to implement the algorithm and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic in the equalizer.

31. (NEW) The apparatus as recited in Claim 30, wherein the set of one or more coefficients is determined based upon modeling noise attributable to the round off errors as a white noise source at an output of the equalizer.

32. (NEW) The apparatus as recited in Claim 26, wherein the demodulator is configured to process the equalized data using finite precision arithmetic and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic to demodulate the equalized data.

33. (NEW) The apparatus as recited in Claim 32, wherein the demodulator is configured to process the equalized data using a fast Fourier transfer algorithm and the set of one or more coefficients is selected to compensate for round off errors attributable to the use of the finite precision arithmetic to implement the fast Fourier transfer algorithm.

34. (NEW) The apparatus as recited in Claim 26, further comprising a finite impulse response (FIR) filter configured to process the receive data.

35. (NEW) The apparatus as recited in Claim 34, wherein the received data is modulated using discrete multitone modulation and a set of one or more (FIR) coefficients for the FIR filter is selected to maximize the number of bits used to represent each discrete multitone symbol in the equalizer.

36. (NEW) The apparatus as recited in Claim 26, further comprising an analog-to-digital converter configured to process the received data and the set of one or more coefficients is further selected to account for quantization noise in the analog-to-digital converter.

37. (NEW) The apparatus as recited in Claim 26, further comprising a coefficient generator for generating the set of one or more coefficients.

38. (NEW) The apparatus as recited in Claim 26, wherein the communications channel is one or more twisted pair telephone lines.

39. (NEW) A computer-readable medium carrying coefficient data that represents a set of one or more coefficients that are selected to account for a frequency domain response of an equalizer when the coefficients are used with an algorithm to equalize received data from a communications channel, wherein the received data is based upon both modulated data and distortion introduced by the communications channel and the modulated data is the result of original data modulated onto one or more carriers.

40. (NEW) A method for generating coefficient data comprising the computer-implemented step of generating coefficient data that represents a set of one or more coefficients that are selected to account for a frequency domain response of an equalizer when the coefficients are used with an algorithm to equalize received data from a communications channel, wherein the received data is based upon both modulated data and distortion introduced by the communications channel and the modulated data is the result of original data modulated onto one or more carriers.

41. (NEW) An apparatus for generating coefficient data comprising:

a storage medium for storing the coefficient data; and

a coefficient generator configured to generate the coefficient data, wherein the coefficient data represents a set of one or more coefficients that are selected to account for a frequency domain response of an equalizer when the coefficients are used with an algorithm to equalize received data from a communications channel, wherein the received data is based upon both modulated data and distortion introduced by the communications channel and the modulated data is the result of original data modulated onto one or more carriers.